



Facts about Strontium

The mineral strontianite was first discovered in Scotland by the chemist Adair Crawford. The year was 1790, but it would be another seventeen-to-eighteen years before Sir Humphrey Davy showed that the mineral contained a new element: strontium.

Physical characteristics

Physically, strontium is a silvery metal:

Freshly cut strontium has a silvery appearance, but rapidly turns a yellowish colour with the formation of the oxide. The finely divided metal ignites spontaneously in air. Volatile strontium salts impart an excellent crimson colour to flames, and these salts are used in pyrotechnics.

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Isotopes

There are four naturally-occurring isotopes of strontium, but the isotope of concern for health physicists is strontium-90, which is created as a byproduct of nuclear fission. Strontium-90 decays to yttrium-90 by emitting a beta particle (an electron), which in turn decays to zirconium-90, also by emitting a beta particle. (Zirconium-90 is stable and does not decay further.)

Health effects & precautions

Like other beta-emitters, strontium-90 is not considered to be a health hazard for external exposures, but if ingested it can become lodged in the bones, where continual, long-term exposure to the beta radiation can result in an increased risk of certain types of cancers.

Concerns about the health effects of strontium-90 were one of the compelling reasons why President Kennedy announced a ban on the atmospheric testing of nuclear weapons in 1963. Above-ground testing of nuclear weapons was, until the accident at Chernobyl, the major contributor to the creation of this radionuclide:

Accidents involving nuclear reactors such as Chernobyl have released strontium into the atmosphere, which ultimately settles to the earth's surface as fallout. Chernobyl contributed the largest worldwide burden of strontium-90 contamination, and a substantial portion of the strontium-90 released was deposited in the former Soviet Republics; with the rest being dispersed as fallout worldwide.

"Common Radionuclides Found at Superfund Sites," EPA

INEEL Oversight monitoring

Monitoring for strontium-90 is included in INEEL Oversight's Environmental Surveillance Program, with quarterly data reports on our findings available from our online library. (See http://www.oversight.state.id.us/ov_library/index.cfm#otd.)



Practical applications

Strontium-90 also has some practical applications:

Strontium-90 is used as a radioactive tracer in medical and agricultural studies. It is also used in thermoelectric devices that are built into small power supplies for use in remote locations, such as navigational beacons, remote weather stations, and space vehicles. Strontium-90 is also used in electron tubes, as a radiation source in industrial thickness gauges, and for treatment of eye diseases.

"Common Radionuclides Found at Superfund Sites," EPA

Where can I learn more?

To learn more about the strontium, see the following:

- The history of the discovery of strontium is presented in "Minerals of Scotland:"
<http://www.curriehj.freeseve.co.uk/strontia.htm>
- Physical and chemical characteristics of strontium can be viewed at webelements.com:
<http://www.webelements.com/webelements/elements/text/Sr/key.html>
- Radio And Television Address to the American People on the Nuclear Test Ban Treaty, President John F. Kennedy, The White House, July 26, 1963:
<http://www.cs.umb.edu/jfklibrary/j072663.htm>
- The Environmental Protection Agency's list of "Common Radionuclides Found at Superfund Sites:"
<http://www.epa.gov/superfund/resources/radiation/nuclides.htm>
- Argonne National Laboratory's fact sheet about strontium:
http://www.oversight.state.id.us/ov_library/Contaminant_Fact_Sheets/Strontium_FactSheet_ANL.pdf